



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/842,802 | 04/27/2001 | Takao Noguchi | 206645US0 | 2819 |

22850 7590 06/25/2002

OBLON SPIVAK MCCLELLAND MAIER & NEUSTADT PC
FOURTH FLOOR
1755 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

| |
|----------|
| EXAMINER |
|----------|

SONG, MATTHEW J

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
|----------|--------------|

1765

8

DATE MAILED: 06/25/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/842,802

Applicant(s)

NOGUCHI ET AL.

Examiner

Matthew J Song

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 August 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claims 1-7 are objected to because of the following informalities: In claim 1, line 3, "which layer" should read "which said layer" or "which said buffer layer". Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nashimoto (US 5,776,621) in view of Kim (US 6,333,066).

Nashimoto discloses a the epitaxial growth of MgO (100) on a silicon substrate with a (100) orientation and a Pt (100) layer grown on the MgO layer and a perovskite PbTiO_3 (001) film grown on the Pt film, where MgO reads on applicant's buffer layer. Nashimoto et al also discloses PZT could also be epitaxially grown on the MgO buffer layer and Pt thin film (col 7, ln 1-32).

Nashimoto is does not disclose a ferroelectric thin film grown on said perovskite oxide thin film.

In a method of forming a PZT thin film using a seed layer, Kim teaches the deposition of a good thin film made of only a perovskite seed by thinly depositing a material such as PbTiO_3

Art Unit: 1765

as a seed layer and then depositing a PZT thin film thereon (col 1, ln 65-67 and col 2, ln 1-6). It would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Nashimoto's invention with Kim's teaching of a PbTiO_3 layer as a seed for PZT because a PZT thin film has good pyroelectricity, piezoelectricity and ferroelectricity and is widely employed for use in sensors, piezoelectric elements and memory devices (col 1, ln 10-15).

Referring to claim 2 and 4, the combination of Nashimoto and Kim teaches a PbTiO_3 perovskite oxide thin film.

Referring to claim 3, the combination of Nashimoto and Kim teaches a Pt layer, this reads on applicant's conductive thin film.

Referring to claim 5, the combination of Nashimoto and Kim teaches a ferroelectric film of PZT.

Referring to claim 6, the combination of Nashimoto and Kim teaches the PZT film is used in sensors.

Referring to claim 7, the combination of Nashimoto and Kim teaches a Si (100) substrate with a buffer layer including an oxide thin film, MgO , thereon and a perovskite thin film with a (001) orientation grown on said buffer layer and a ferroelectric thin film grown on the perovskite thin film.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Art Unit: 1765

Nashimoto et al (US 6,078,717) teaches a PZT (100) layer on a SrTiO_3 (100) on a Pt (100) on a MgO (100) (col 23, ln 30-55).

Roeder et al. (US 5,876,503) teaches a PbZrTiO_3 layer is deposited on a seed layer of PbTiO_3 (col 11, ln 30-40).

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J Song whose telephone number is 703-305-4953. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin L Utech can be reached on 703-308-3868. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Matthew J Song
Examiner
Art Unit 1765

mjs
June 20, 2002


BENJAMIN L. UTECH
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700